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## CLAIMS

1. A beverage in an open topped vessel, said beverage  
5 comprising a water content and a dissolved gas content, and in said vessel  
the beverage has a head of foam over ice, said ice being formed in the  
beverage from water of said water content.

2. A method of keeping an alcoholic beverage in an open-  
10 topped vessel cool said beverage comprising a water content and a  
dissolved gas content, and said method comprising forming ice in the  
beverage in the open-topped vessel having a cooling effect on the  
beverage, said ice being formed in the beverage from water of said water  
content.

3. A method of sustaining cooling ice in a beverage in an open-  
topped vessel, said beverage comprising a water content and a dissolved  
gas content, and wherein said ice is formed in the beverage from water of  
said water content, said method comprising providing a head of foam on  
20 the beverage such that in the vessel said ice is covered by the head which  
acts as heat insulation above the ice against heat directed towards the ice  
from above the head.

4. A method of sustaining a head on a beverage in an open-  
25 topped vessel, said beverage comprising a water content and a dissolved  
gas content said method comprising providing said head on the beverage  
and forming ice in the beverage from water of said water content, and in  
said vessel said ice having a cooling effect on the head from below an  
upper part of the head.

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5. An open-topped vessel of a beverage, the beverage comprising a water content and a dissolved gas content and being able to form a head as the beverage is dispensed into the vessel, the vessel of beverage having a head overlying an ice formation made of many ice crystals, the ice formation having been produced by ice forming in the beverage as it was dispensed or after it was dispensed into the vessel.

6. A beverage as claimed in claim 1 or claim 5 or a method as claimed in any one of claims 2 to 4 in which the beverage has been subjected to the effect of ultrasound signals and the beverage is draught beverage delivered into a vessel.

7. A beverage as claimed in claim 5 or claim 6 or a method as claimed in Claim 6, in which immediately before the draught beverage is delivered into the vessel said beverage is cooled to a temperature below the freezing point of water at ambient atmospheric pressure.

8. A method of serving draught beverage in an open-topped vessel, said beverage comprising a water content and a dissolved gas content, and said method comprising cooling the beverage to a temperature below the freezing point of water at ambient atmospheric pressure, and delivering the cooled beverage into said vessel, said cooled beverage being subjected to the effect of ultrasound signals or to the effect of other ice and/or gas bubble nucleation means.

9. A beverage as claimed in any one of claims 5 to 7, or a method as claimed in claim 8, in which the ultrasound signals are applied externally of said vessel.

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10. A beverage as claimed in any one of claims 5 to 9, or a method as claimed in claim 8 or 9, in which the ultrasound signals are applied internally of said vessel to the cooled beverage.

5 11. A beverage as claimed in claim 10 or a method as claimed in claim 10, in which an ultrasound signal emitter is disposed in the beverage in the vessel emitting ultrasound signals into the beverage in the vessel.

10 12. A beverage as claimed in any one of claims 9, 10, or 11 or a method as claimed in any one of claims 9, 10, or 11, in which a dispense outlet or nozzle from which beverage is delivered into said vessel is adapted to act as an ultra-sonic emitter to provide aforesaid ultrasound signals.

15 13. A beverage as claimed in claim 12 or a method as claimed in claim 12, in which aforesaid ultrasound signals are applied to aforesaid beverage flowing through the dispense outlet.

20 14. A beverage as claimed in any one of claims 5 to 13, or a method as claimed in any one of claims 5 to 13 in which the ultrasound signals have a frequency in the range of 20kHz to 70kHz.

25 15. A beverage or a method as claimed in claim 14, in which the ultrasound signals have a frequency of substantially 30kHz.

16. A beverage as claimed in any one of claims 1, 5, 6, 7, 9, to 15, or a method as claimed in any one of claims 2 to 4 or 8 to 14, in which a mass of said ice develops downwards in the beverage below the head.

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17. A beverage as claimed in any one of claims 1, 5, 6, 7 or 9 to 16, or a method as claimed in any one of claims 2 to 4 or 8 to 16 in which the vessel is chilled before beverage is delivered thereinto.
- 5 18. A beverage or a method as claimed in claim 17, in which the vessel is chilled to a temperature of substantially 4°C, or the vessel is chilled to a temperature less than 4°C.
19. A beverage or a method as claimed in claim 17, in which the vessel  
10 is chilled to a temperature of substantially 0°C.
20. A beverage as claimed in claim 7 or in any one of claims 9 to 19 when appended to claim 7, or a method as claimed in claim 8 or in any one of claims 9 to 19 when appended to claim 8, in which the beverage is  
15 cooled to a temperature between substantially -1°C and substantially -12°C.
21. A beverage or a method as claimed in claim 20, in which the beverage is cooled to a temperature between substantially -4°C and  
20 substantially -6°C.
22. A beverage as claimed in any one of claims 1, 5, 6, 7, or 9 to 21 or a method as claimed in any one of claims 2 to 4 or 8 to 21, in which the vessel has a wall portion of sufficient transparency to allow the  
25 contents of the vessel to be visible through said wall portion.
23. A beverage or a method as claimed in claim 22, in which the vessel is a glass drinking vessel.

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24. A beverage as claimed in any one of claims 1, 5, 6, 7 or 9 to 23, or a method as claimed in any one of Claims 2 to 4 or 8 to 23 in which the beverage has a pale beer colour.

5 25. A beverage as claimed in any one of claims 1, 5, 6, 7 or 9 to 24 or a method as claimed in any one of claims 2 to 4 or 8 to 24 in which aforesaid dissolved gas comprises carbon dioxide and/or comprises nitrogen.

10 26. A beverage or a method as claimed in claim 25, in which the dissolved nitrogen content in the beverage is in the range of substantially zero parts per million (p.p.m.) to substantially 100 parts p.p.m.

15 27. A beverage or a method as claimed in claim 25 or in claim 26, in which the dissolved carbon dioxide content is about zero % by volume or greater.

20 28. A beverage or a method as claimed in claim 27, in which the carbon dioxide is substantially 2.2% or substantially 4% or substantially 5% by volume.

25 29. A beverage as claimed in any one of claims 5 to 7 or in any one of claims 9 to 28 when appended to claim 6, or a method as claimed in claim 8, or in any one of claims 9 to 28 when appended to claim 8, in which the ultrasound signals are accompanied by a mechanically or electrically produced audible performance and/or a visible light display.

30 30. A beverage or a method as claimed in claim 29, in which the audible performance is a tuneful or musical sound.

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31. A beverage or a method as claimed in claim 29 or claim 30, in which the visible light display comprises visible flashes of light.

5 32. A beverage as claimed in claim 6 or claim 7, or in any one of claims 9 to 32 when appended to claim 6, or a method as claimed in claim 8, or in any one of claims 9 to 31 when appended to claim 8, in which the beverage is subjected to ultrasound within an enclosure arranged to conceal the vessel from view from at least one side of said enclosure.

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33 An alcoholic beverage comprising a water content and a dissolved gas content wherein prior to being drunk said beverage is cooled to a temperature below the freezing point of water at ambient atmospheric pressure and delivered in a container to be drunk exposed to ambient atmospheric pressure, and wherein in said container aforesaid gas bubbles out of the beverage and at least a portion of said water content becomes ice.

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34. An alcoholic beverage to be available on draught and comprising a water content and a dissolved gas content, wherein prior to being drunk the draught beverage is to issue, at a temperature below the freezing point of water at ambient atmospheric pressure, from an outlet into a container open to ambient atmospheric pressure so that the aforesaid gas bubbles out of the beverage and at least a portion of said water content becomes ice.

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35. A beverage as claimed in Claim 33 and in any one of Claims 5 to 7 or 9 to 32, or as claimed in Claim 34 and in any one of Claims 5 to 7 or 9 to 32, wherein said container is said open-topped vessel.

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36. A beverage as claimed in claim 35 in which said vessel has at least a wall portion of sufficient transparency to allow the contents of the vessel to be visible through said wall portion.

5 37. A beverage as claimed in claim 35 or claim 36 in which the vessel is made of glass.

38. A beverage as claimed in any one of claims 35 to 37, in which the vessel has a shape or formation to promote formation of said ice.

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39. A beverage as claimed in any one of claims 35 to 38, in which the vessel has an internal surface arranged to provide nucleation sites to promote formation of said ice.

15 40. A beverage as claimed in claim 39, in which said surface has at least a surface portion which is roughened.

41. A beverage as claimed in any one of claims 35 to 40, in which the vessel has at least a wall portion arranged to change colour automatically with variations in temperature.

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42. A beverage as claimed in claim 41, in which said wall portion comprises thermo-chromic material.

25 43. A beverage as claimed in any one claims 33 to 42 in which the formed ice includes therein one or more streaks or regions of one or more colours which contrasts(s) with the colour of the ice and/or beverage.

44. A method of serving a draught alcoholic beverage which comprises a water content and a dissolved gas content, said method comprising

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issuing the draught beverage from an outlet into an open topped vessel, prior to said issuing, storing or handling the beverage in a manner which impedes loss of aforesaid dissolved gas from the beverage and cooling said beverage to a temperature below the freezing point of water at said ambient atmospheric pressure, and in said vessel aforesaid gas bubbles out of the beverage at least a portion of said water becomes ice.

45. A method of providing a visual display or effect within an open-topped vessel having at least a portion of wall of some transparency, said method comprising providing a draught alcoholic beverage comprising a water content and a dissolved gas content, issuing the draught beverage from an outlet into a said vessel, prior to said issuing, storing or handling of the beverage which impedes loss of aforesaid dissolved gas from the beverage and cooling said beverage to a temperature below the freezing point of water at said ambient atmospheric pressure, a visual display or effect developing in the beverage in the vessel, said visual display or effect comprising aforesaid gas bubbling out of the beverage and formation of ice due to at least a portion of said water becoming ice.

46. A method as claimed in claim 44, in which the vessel has a wall portion of some transparency.

47. A method as claimed in any one of claims 44 to 46, in which the vessel comprises glass.

48. A method as claimed in any one of claims 44 to 47, in which formation of ice develops in the vessel so as to increase the amount and extent of the ice from substantially an upper level of the beverage downwards through the beverage.



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49. A method as claimed in any one of claims 44 to 48, in which the vessel has at least a wall portion which changes colour automatically with variation in temperature.

5 50. A method as claimed in claim 49, in which said wall portion comprises thermo-chromic material.

10 51. A method as claimed in any one of claims 44 to 49 in which the vessel has a shape or formation to encourage the forming of the ice.

52. A method as claimed in any one of claims 44 to 51, in which the vessel has one or more internal formations to encourage the forming of the ice.

15 53. A method as claimed in claim 52, in which at least a portion of an internal wall of the vessel has a roughened texture.

54. A method as claimed in any one of claims 44 to 53, in which the vessel is adapted to encourage formation of further ice in the beverage  
20 below an upper layer of forming ice, and said further ice rising to joint said upper layer.

55. A method as claimed in any one of claims 44 to 54, in which an implement is inserted into the beverage in the vessel to encourage  
25 formation of said ice.

56. A method as claimed in claim 55, in which said implement is a thermometer.

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57. A method as claimed in claim 56, in which said implement is a swizzle-stick.

58. A method as claimed in any one of claims 44 to 57, in which  
5 colouring material or dye is provided to form at least one coloured streak or region in the beverage and/or ice, the colour of said material or dye being in contrast to that of the ice and/or beverage so as to be visible.

59. A method as claimed in claim 58, when appended to any one of  
10 claims 47 to 57, in which said implement is used to add the colouring material or dye to the beverage and/or ice.

60. A beverage as claimed in any one of Claims 1, 5 to 7, or 9 to 43,  
15 or a method as claimed in any one of Claims 2 to 4, 8, 9 to 32 or 44 to 59, in which said ice comprises slush.

61. Apparatus to supply a draught beverage, comprising beverage  
cooling heat exchange means, a beverage outlet for cold beverage from  
said heat exchange means to issue from the outlet, openable and closable  
20 valve means to control supply of beverage to said outlet, and a beverage circulation loop for beverage to circulate in said loop.

62. Apparatus as claimed in claim 61, in which the beverage circulates  
25 in said loop when the valve means is closed.

63. Apparatus as claimed in claim 61 or claim 62, in which said loop  
comprises pump means to circulate beverage in the loop.

64. Apparatus as claimed in any one of claims 61 to 63, in which the  
30 beverage is circulated to reduce the risk of, or avoid, freezing beverage blocking a beverage supply path to the outlet.

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72. Apparatus as claimed in any one of claims 61 to 67, in which said heat exchange means is first heat exchange means and second beverage

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cooling heat exchange means is provided to act on at least a portion of said loop.

73. Apparatus as claimed in claim 72, in which coolant common to the first and second heat exchange means circulates therethrough.

74. Apparatus as claimed in claim 67, in which intermediate said reservoir and said loop the beverage is subject to the effect of further beverage cooling heat exchange means.

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75. Apparatus as claimed in any one of claims 61 to 74 in which the apparatus is arranged to operate so that the beverage which emerges from said outlet is at a temperature below the freezing point of water at the ambient atmospheric pressure.

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76. Apparatus as claimed in any one of claims 61 to 74, in which the apparatus is arranged to operate so that the beverage which emerges from said outlet is at a temperature of between substantially  $-1^{\circ}\text{C}$  and substantially  $-12^{\circ}\text{C}$ .

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77. A beverage as claimed in Claim 1 or Claim 5 or as claimed in any one of Claims 6, 7, 9 to 32 or 60 when any one is appended to Claim 1 or Claim 5, or a method as claimed in Claim 3 or Claim 4 or as claimed in any one of Claims 6 to 8 or 9 to 32 when any one is appended to Claim 3 or Claim 4, or an apparatus to supply a beverage as claimed in any one of Claims 61 to 76, in which the beverage is non-alcoholic.

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78. A beverage as claimed in Claim 1 or Claim 5 or as claimed in any one of Claims 6, 7, 9 to 32 or 60 when any one is appended to Claim 1 or Claim 5, or a method as claimed in any one of Claims 6 to 8 or 9 to 32

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when any one is appended to Claim 3 or Claim 4, or an apparatus to supply a beverage as claimed in any one of Claims 61 to 76, in which the beverage is alcoholic.

5 79. A beverage, a method or an apparatus as claimed in Claim 78 in which said alcoholic beverage is a beer.

80. A beverage, a method or an apparatus as claimed in Claim 76 or Claim 77, in which said beer is a lager.

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81. A beverage, a method or an apparatus as claimed in Claim 78, in which said alcoholic beverage is a cider.

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82. A method of serving draught cider in an open-topped vessel and wherein said cider comprises a water content and a dissolved gas content, said method comprising cooling the cider to a temperature below the freezing point of water at ambient atmospheric pressure, and delivering the cooled cider into said vessel, said cooled cider being subjected to the effect of ultra-sound signals.

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83. A method as claimed in Claim 82, in which the cider is cooled to a temperature in the range of substantially  $-1^{\circ}\text{C}$  to substantially  $-12^{\circ}\text{C}$ .

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84. A method as claimed in Claim 83, in which the cider is cooled to a temperature of substantially  $-6^{\circ}\text{C}$ .

85. A method as claimed in any one of Claims 82 to 84, in which the cooled cider issues from a dispense outlet through a sparkler.

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86. A method as claimed in any one of Claims 82 to 84, in which the cooled cider passes through an orifice plate in a dispense outlet from which the cider issues.

5 87. A method as claimed in any one of Claims 82 to 86, in which the open-topped vessel is chilled before receiving the cider.

88. A method as claimed in Claim 87, in which the open-topped vessel is chilled to substantially 4°C or chilled to a temperature lower than 4°C.

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89. A method as claimed in Claim 88, in which the open-topped vessel is chilled to substantially 0°C.

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90. A method as claimed in any one of Claims 82 to 89, in which said ultra-sound signals have a frequency in the range of substantially 20kHz to substantially 70 kHz.

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91. A method as claimed in Claim 90, in which the ultra-sound signals have a frequency of substantially 30kHz.

92. A method as claimed in any one of Claims 82 to 91, in which the ultra-sound signals are applied externally of said vessel to said vessel.

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93. A method as claimed in any one of Claims 82 to 91, in which the ultra-sound signals are applied internally of said vessel to the cooled cider.

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94. A method as claimed in Claim 93 in which an ultra-sonic signals emitter is disposed in the cider in the vessel for emitting ultra-sound signals into the cider in the vessel.

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95. A method as claimed in Claim 93 or 94, in which a or the dispense outlet from which the cooled cider issues into said vessel is adapted to act as an ultra-sonic signal emitter to produce aforesaid ultra-sound signals.

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96. A method as claimed in Claim 95, in which aforesaid ultra-sound signals are applied to aforesaid cider flowing through the dispense outlet.

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97. A method as claimed in any one of Claims 82 to 96, in which the dissolved gas content comprises carbon dioxide and/or nitrogen.

98. A method as claimed in Claim 97, in which the carbon dioxide content is substantially zero % by volume or greater and/or the nitrogen content is substantially zero parts per million (p.p.m.) or greater.

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99. Cider in an open-topped vessel wherein said cider comprises a dissolved gas content and a water content, and wherein said cider has a head of foam over ice, said ice being formed in the cider from water of said water content.

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100. Cider as claimed in Claim 99, in which said head and ice are produced at least in part by performance of a method as claimed in any one of claims 82 to 98.

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101. A method of sustaining a head on cider in an open-topped vessel wherein said cider comprises a dissolved gas content and a water content, said method comprising providing a head on the cider and forming ice in the cider from water of said water content, and in said vessel said ice forming a layer covered by said head.

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102. A method as claimed in Claim 101, in which said head and ice are produced at least in part by performance of a method as claimed in any one of Claims 82 to 98.

5 103. A beverage as claimed in any one of Claims 78 to 81, in which the beverage comprises 2.5% to 7% alcohol by volume (abv).

104. A beverage as claimed in Claim 103, in which the beverage comprises 3.5% to 5.5% abv.

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105. A beverage as claimed in any one of Claims 77 to 81 or 103 or 104, in which the beverage is a draught beverage.

106. A beverage as claimed in Claim 1 and substantially as hereinbefore  
15 described with reference to Figures 1 to 19 or Figures 20 to 25 of the accompanying drawings.

107. A method of keeping a beverage in an open-topped vessel cool,  
substantially as hereinbefore described with reference to Figures 2 to 4,  
20 or Figures 2 to 5, or Figures 2 to 4 and 6, or Figures 2 to 4 and 7, or  
Figures 1 to 4, or Figures 1 to 5, or Figures 1, 2 to 4 and 6, or Figures  
1, 2 to 4 and 7, or Figures 8 to 15, or Figures 8 to 16, or Figures 8 to 15  
and 17, or Figures 1, and 8 to 15, or Figures 1 and 8 to 16, or Figures 1  
and 8 to 15 and 17, or Figures 18 and 19, or Figures 21 to 23, or Figures  
25 22 to 24 or Figures 22, 23 and 24, or Figures 20 to 23, or Figures 20 and  
22 to 24, or Figures 20 and 22, 23 and 25 of the accompanying drawings.

~~108. A method of sustaining cooling ice in a beverage in an open-topped  
vessel and wherein said ice is formed in the beverage from water of a  
30 water content of the beverage, said method being substantially as~~



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hereinbefore described with reference to Figures 2 to 4, or Figures 2 to 5, or Figures 2 to 4 and 6, or Figures 2 to 4 and 7, or Figures 1 to 4, or Figures 1 to 5, or Figures 1, 2 to 4 and 6, or Figures 1, 2 to 4 and 7, or Figures 8 to 15, or Figures 8 to 16, or Figures 8 to 15 and 17, or Figures 1, and 8 to 15, or Figures 1 and 8 to 16, or Figures 1 and 8 to 15 and 17, or Figures 18 and 19, or Figures 21 to 23, or Figures 22 to 24, or Figures 22, 23 and 24, or Figures 20 to 23, or Figures 20 and 22 to 24, or Figures 20 and 22, 23 and 25 accompanying drawings.

10 109. A method of sustaining a head on a beverage in an open-topped vessel, substantially as hereinbefore described with reference to Figures 2 to 4, or Figures 2 to 5, or Figures 2 to 4 and 6, or Figures 2 to 4 and 7, or Figures 1 to 4, or Figures 1 to 5, or Figures 1, 2 to 4 and 6, or Figures 1, 2 to 4 and 7, or Figures 8 to 15, or Figures 8 to 16, or Figures 8 to 15 and 17, or Figures 1, and 8 to 15, or Figures 1 and 8 to 16, or Figures 1 and 8 to 15 and 17, or Figures 18 and 19, or Figures 21 to 23, or Figures 22 to 24, or Figures 22, 23 and 24, or Figures 20 to 23, or Figures 20 and 22 to 24, or Figures 20 and 22, 23 and 25 accompanying drawings.

20 110. A method of serving draught beverage in an open-topped vessel, substantially as hereinbefore described with reference to Figures 2 to 4, or Figures 2 to 5, or Figures 2 to 4 and 6, or Figures 2 to 4 and 7, or Figures 1 to 4, or Figures 1 to 5, or Figures 1, 2 to 4 and 6, or Figures 1, 2 to 4 and 7, or Figures 8 to 15, or Figures 8 to 16, or Figures 8 to 15 and 17, or Figures 1, and 8 to 15, or Figures 1 and 8 to 16, or Figures 1 and 8 to 15 and 17, or Figures 18 and 19, or Figures 21 to 23, or Figures 22 to 24, or Figures 22, 23 and 24, or Figures 20 to 23, or Figures 20 and 22 to 24, or Figures 20 and 22, 23 and 25.

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